Human AI Interaction

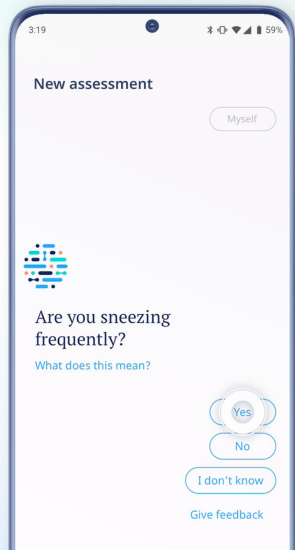## Lecture 7: Collaborating with AI
aidesignclass.org

Today

- Metaphors for collaboration with AI
  - Agents
  - Tools
  - Mixed initiative
- Making implicit metaphors explicit
- If time, teardown of the tool we missed last week

What does it mean to collaborate with AI?

Two metaphors: agents and direct-manipulation tools

Answer Ada's
health questions

3:19

New assessment

Myself

Are you sneezing
frequently?
What does this mean?

Yes
No
I don't know

Give feedback

<- Agent
(Ada, commercial app
for checking
symptoms)

Direct manipulation
(Remove object from
image, RunwayML) ->
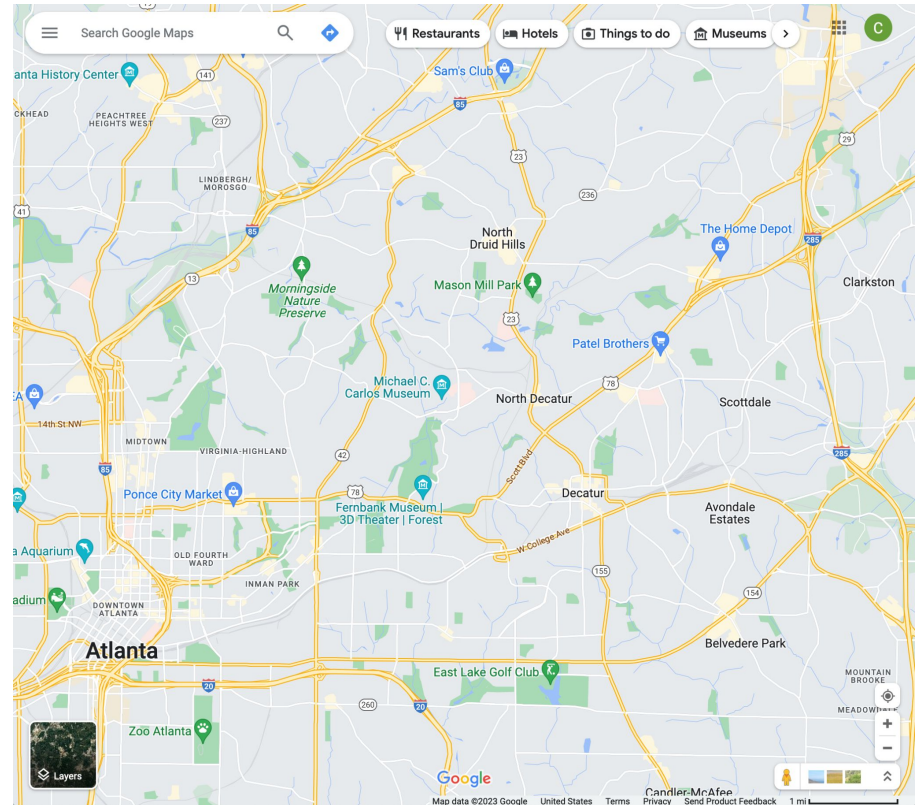
Big ideas of direct manipulation

- Affordances
- Operations mapped to visual interactions
- Composable interactions

Affordances = "How things look should suggest how they work"

Visual interactions = what you do visually is what you get semantically (e.g. volume slider)

Composable interactions = if you drag a file to move to a different folder, dragging a folder should move all files "inside" the folder

Composition is through an algebra - this is defined

Corollaries of direct manipulation

- Affordances
- Operations mapped to visual interactions
- Composable interactions

Corollaries

1. Immediate feedback: you drag a map, it should move immediately
2. Reduced cognitive load: nothing to remember, everything is visible
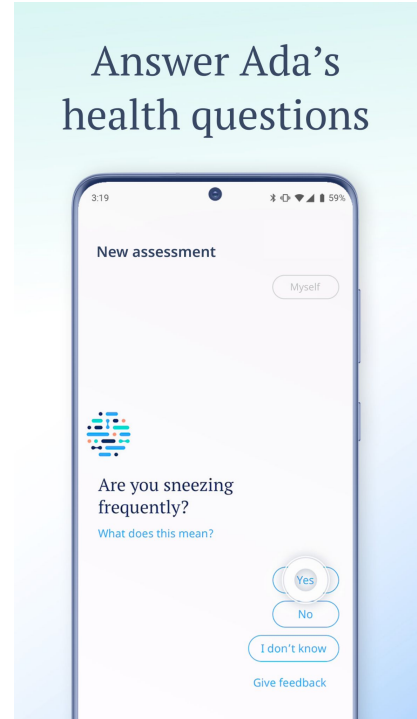3. User control: everything reacts to a user's visual operations
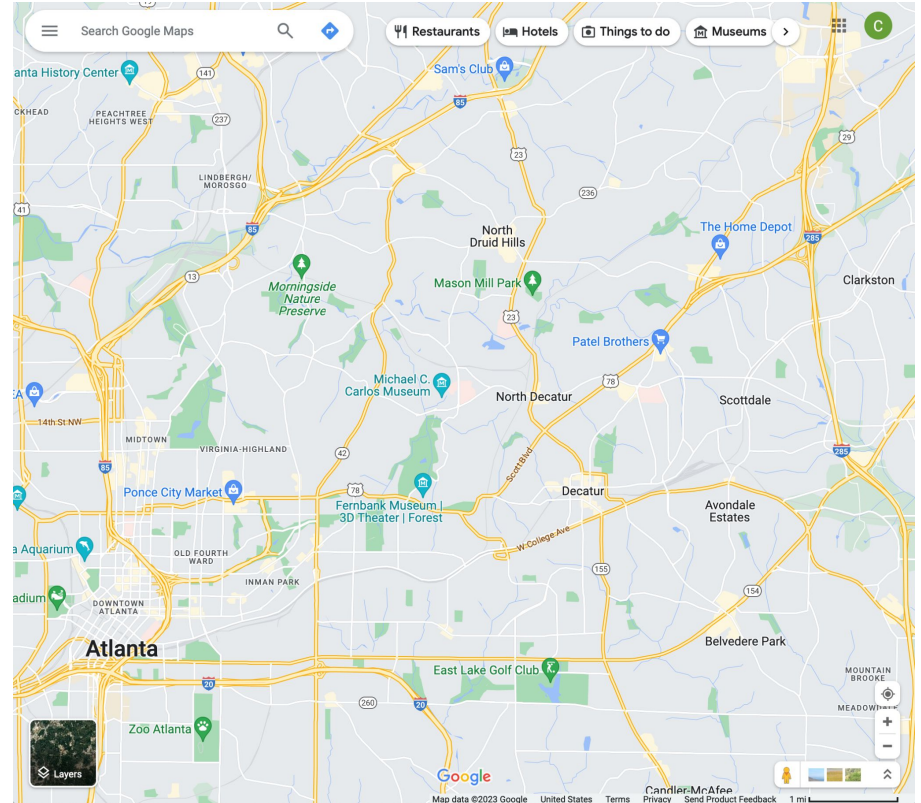
Big ideas around Agents

- Initiative
- Memory
- Language interaction

Initiative = The system may start an action, not necessarily in response to user action

Memory = remember previous interactions, "commonsense" facts, knowledge about the world

Language interactions = ambiguous user intents

Where are we?

What are some things this voice agent (HAL) is able to do that our AI assistants are not able to do today?

2001: A Space Odyssey

Debate at IUI' 97:

Direct manipulation agents

Software

vs

Enhance users' abilities to directly manipulate objects

Build machinery for sensing a user's activity and taking automated actions

Questions

- Could you give some examples of where direct manipulation is ideal?
- Could you give some examples for software agents?

Principles of Mixed-Initiative User Interfaces

Eric Horvitz
Microsoft Research
Redmond, WA 98025 USA
+1 425 936 2127
horvitz@microsoft.com

ABSTRACT

Recent debate has centered on the relative promise of focusing user-interface research on developing new metaphors and tools that enhance users' abilities to directly manipulate objects *versus* directing effort toward developing interface agents that provide automation. In this paper, we review principles that show promise for allowing engineers to enhance human–computer interaction through an elegant coupling of automated services with direct manipulation. Key ideas will be highlighted in terms of the LookOut system for scheduling and meeting management.

Keywords

Intelligent agents, direct manipulation, user modeling, probability, decision theory, UI design

INTRODUCTION

There has been debate among researchers about where great opportunities lay for innovating in the realm of human—computer interaction [10]. One group of researchers has expressed enthusiasm for the development and application of new kinds of automated services, often referred to as interface "agents." The efforts of this group center on building machinery for sensing a user's activity and taking automated actions [4,5,6,8,9]. Other researchers have

wish to avoid limiting designs for human–computer interaction to direct manipulation when significant power and efficiencies can be gained with automated reasoning. There is great opportunity for designing innovative user interfaces, and new human–computer interaction modalities by considering, from the ground up, designs that take advantage of the power of direct manipulation and potentially valuable automated reasoning [2].

PRINCIPLES FOR MIXED-INITIATIVE UI

Key problems with the use of agents in interfaces include poor guessing about the goals and needs of users, inadequate consideration of the costs and benefits of automated action, poor timing of action, and inadequate attention to opportunities that allow a user to guide the invocation of automated services and to refine potentially suboptimal results of automated analyses. In particular, little effort has been expended on designing for a *mixed-initiative* approach to solving a user's problems—where we assume that intelligent services and users may often collaborate efficiently to achieve the user's goals.

Critical factors for the effective integration of automated services with direct manipulation interfaces include:

Mixed Initiative Design

- Developing significant value-added automation
- Considering uncertainty about a user's goals
- Considering the status of a user's attention in the timing of services.
- Inferring ideal action in light of costs, benefits, and uncertainties
- Employing dialog to resolve key uncertainties.
- Allowing efficient direct invocation and termination.
- Minimizing the cost of poor guesses about action and timing.
- Scoping precision of service to match uncertainty, variation in goals.
- Providing mechanisms for efficient agent−user collaboration to refine results.
- Employing socially appropriate behaviors for agent−user interaction.
- Maintaining working memory of recent interactions.
- Continuing to learn by observing.

Guidelines for Human AI Interaction
Learn more: https://aka.ms/aiguidelines

INITIALLY

1
Make clear what the system can do.

2
Make clear how well the system can do what it can do.

DURING INTERACTION

3
Time services based on context.

4
Show contextually relevant information.

5
Match relevant social norms.

6
Mitigate social biases.

WHEN WRONG

7
Support efficient invocation.

8
Support efficient dismissal.

9
Support efficient correction.

10
Scope services when in doubt.

11
Make clear why the system did what it did.

13

OVER TIME

12
Remember recent interactions.

13
Learn from user behavior.

14
Update and adapt cautiously.

15
Encourage granular feedback.

16
Convey the consequences of user actions.

17
Provide global controls.

18
Notify users about changes.

What does it mean to collaborate with AI?

Teardown 2: post-editing translation

- How do you do the suggestion in E?
- How do you do the pop-up in D?
- How do you learn from what the user chose?
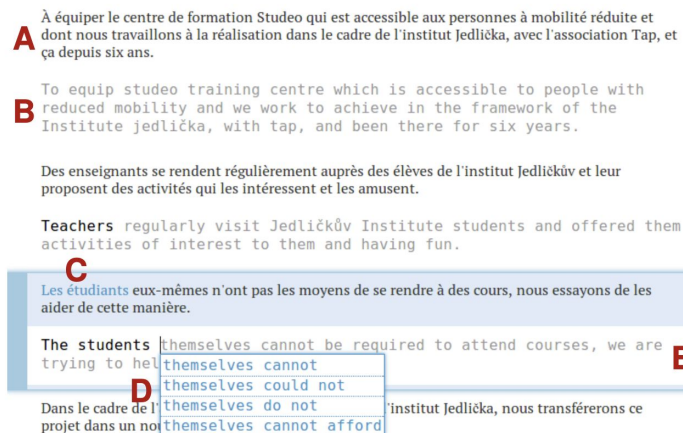
Figure 2: Main translation interface. The interface shows the full document context, with English source inputs (A) interleaved with suggested target translations (B). The sentence in focus is indicated by the blue rectangle, with translated source words shaded (C). The user can navigate between sentences via hot keys. The user can also hide/unhide the autocomplete dropdown (D) and full translation suggestions (E) by toggling the Escape key.

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Teardown 2: post-editing translation

- How do you do the pop-up in D?

  Try your own prompts!

À équiper le centre de formation Studeo qui est accessible aux personnes à mobilité réduite et dont nous travaillons à la réalisation dans le cadre de l'institut Jedlička, avec l'association Tap, et ça depuis six ans.

To equip studeo training centre which is accessible to people with reduced mobility and we work to achieve in the framework of the Institute jedlička, with tap, and been there for six years.

Des enseignants se rendent régulièrement auprès des élèves de l'institut Jedličkův et leur proposent des activités qui les intéressent et les amusent.

Teachers regularly visit Jedličkův Institute students and offered them activities of interest to them and having fun.

Les étudiants eux-mêmes n'ont pas les moyens de se rendre à des cours, nous essayons de les aider de cette manière.

The students themselves cannot be required to attend courses, we are trying to hel...

- themselves cannot
- themselves could not
- themselves do not
- themselves cannot afford

Dans le cadre de l'...institut Jedlička, nous transférerons ce projet dans un no...

Figure 2: Main translation interface. The interface shows the full document context, with English source inputs (A) interleaved with suggested target translations (B). The sentence in focus is indicated by the blue rectangle, with translated source words shaded (C). The user can navigate between sentences via hot keys. The user can also hide/unhide the autocomplete dropdown (D) and full translation suggestions (E) by toggling the Escape key.

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Teardown 2: post-editing translation

- How do you learn from what the user chose?

  Change the prompt to make it a few-shot prompt!

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